Region 4 Inventory and Monitoring Branch

Mobile Acoustical Bat Monitoring
Annual Summary Report

2018

Trinity River National Wildlife Refuge

The Region 4 Inventory and Monitoring Branch coordinates acoustical bat monitoring on participating National Wildlife Refuges and Ecological Services field offices in Regions 2, 3, and 4. Surveys establish baseline inventories of bat species at each station and contribute to a landscape-level understanding of bat population trends and habitat associations. Bat call data are collected using Anabat SD2 detectors along road-based transects during June and July of each year following the procedures outlined in the Mobile Bat Acoustical Survey Protocol[1].

This report summarizes bat calls collected along driven survey routes at Trinity River National Wildlife Refuge in 2018 and provides annual species detections from 2015 to 2017 for comparison. Calls were classified using the BCID Eastern USA (version 2.7c) software. Automated acoustical bat classification is limited in part by call quality, species filter constraints, and statistical model agreement parameters. We applied a species filter to limit classifications only to those bat species expected to occur at Trinity River National Wildlife Refuge during the sampling interval. We considered species classifications conservatively by classifying only those calls with ≥ 5 ultrasonic pulses. While we expect that this conservative approach resulted in robust species classifications, it necessarily means that we may underestimate the actual number of bats detected. We geo-referenced calls to the nearest corresponding GPS location collected along the route.

The accuracy of call classification varies among species but is generally reported to be $> 85\%$ correct. Measures of confidence in species identification are available as a maximum-likelihood estimator p-value for each observed species in the BCID output files included in this report package. BCID software does not classify the following species: Seminole bat (*Lasiurus seminolus*), Northern yellow bat (*Lasiurus intermedius*), or Brazilian free-tailed bat (*Tadarida brasiliensis*). These species generally will be classified to a species with the closest model agreement or classified as "unknown."

This annual report package contains summary information on route surveys, and a digital folder containing shapefiles and BCID classification output files. Summary tables include all classified species observations including those lacking an associated spatial reference. All submitted raw call data and survey metadata are archived and available on the Mobile Acoustical Bat Monitoring SharePoint site (https://fishnet.fws.doi.net/regions/4/nwrs/IM/bats). Bat call files, GPS data, and survey metadata sheets were reviewed for quality assurance prior to generation of this report. Some submitted data were necessarily excluded due to errors identified in the collection processes.

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[1]U.S Fish and Wildlife Service. 2012. Mobile Bat Acoustical Survey Protocol, U.S. Fish and Wildlife Service, Region 4, Division of Refuges

Trinity River NWR (TrnNWR) route

Table 1: 2018 survey route (TrnNWR) summary.

Survey date	# bat calls	Route completed?	GPS data?	Survey notes
27 Jun	24	✓	✓	I think the interns pressed start or record to pause the recording when they stopped to turn around. Turned unit on to set up at 2106, hit pause before starting at 2111. Paused at 2230 to turn around and drive back to the main road (2185) and turned devi
10 Jul	11	✓	✓	It is just hard to remind them not to press the record button to pause.

Table 2: 2018 survey route (TrnNWR) nightly species detection summary. Total route length = 23.126 miles.

Species	Survey date	# bats detected	Bats mile
Big Brown Bat	27 Jun	2	0.09
	10 Jul	0	0.00
Eastern Red Bat	27 Jun	5	0.22
	10 Jul	0	0.00
Evening Bat	27 Jun	8	0.35
	10 Jul	4	0.17
Southeastern Myotis	27 Jun	1	0.04
	10 Jul	0	0.00
Tricolored Bat	27 Jun	7	0.30
	10 Jul	7	0.30
Unknown	27 Jun	1	0.04
	10 Jul	0	0.00

Species detection summary (2015 - 2018)

Table 3: Annual survey route (TrnNWR) species detection summary, including classified calls without a spatial reference. Total route length = 23.126 miles.

| Species	Year	Total # detected	# surveys	Total bats/mile
Big Brown Bat	2015	14	2	0.30
	2016	14	2	0.30
	2017	0	2	0.00
	2018	2	2	0.04
Eastern Red Bat	2015	24	2	0.52
	2016	33	2	0.71
	2017	19	2	0.41
	2018	5	2	0.11
Evening Bat	2015	30	2	0.65
	2016	25	2	0.54
	2017	41	2	0.89
	2018	12	2	0.26
Rafinesque's Big-eared Bat	2015	0	2	0.00
	2016	2	2	0.04
	2017	0	2	0.00
	2018	0	2	0.00
Southeastern Myotis	2015	2	2	0.04
	2016	4	2	0.09
	2017	2	2	0.04
	2018	1	2	0.02
Tricolored Bat	2015	26	2	0.56
	2016	35	2	0.76
	2017	20	2	0.43
	2018	14	2	0.30
Unknown	2015	4	2	0.09
	2016	5	2	0.11
	2017	4	2	0.09
	2018	1	2	0.02
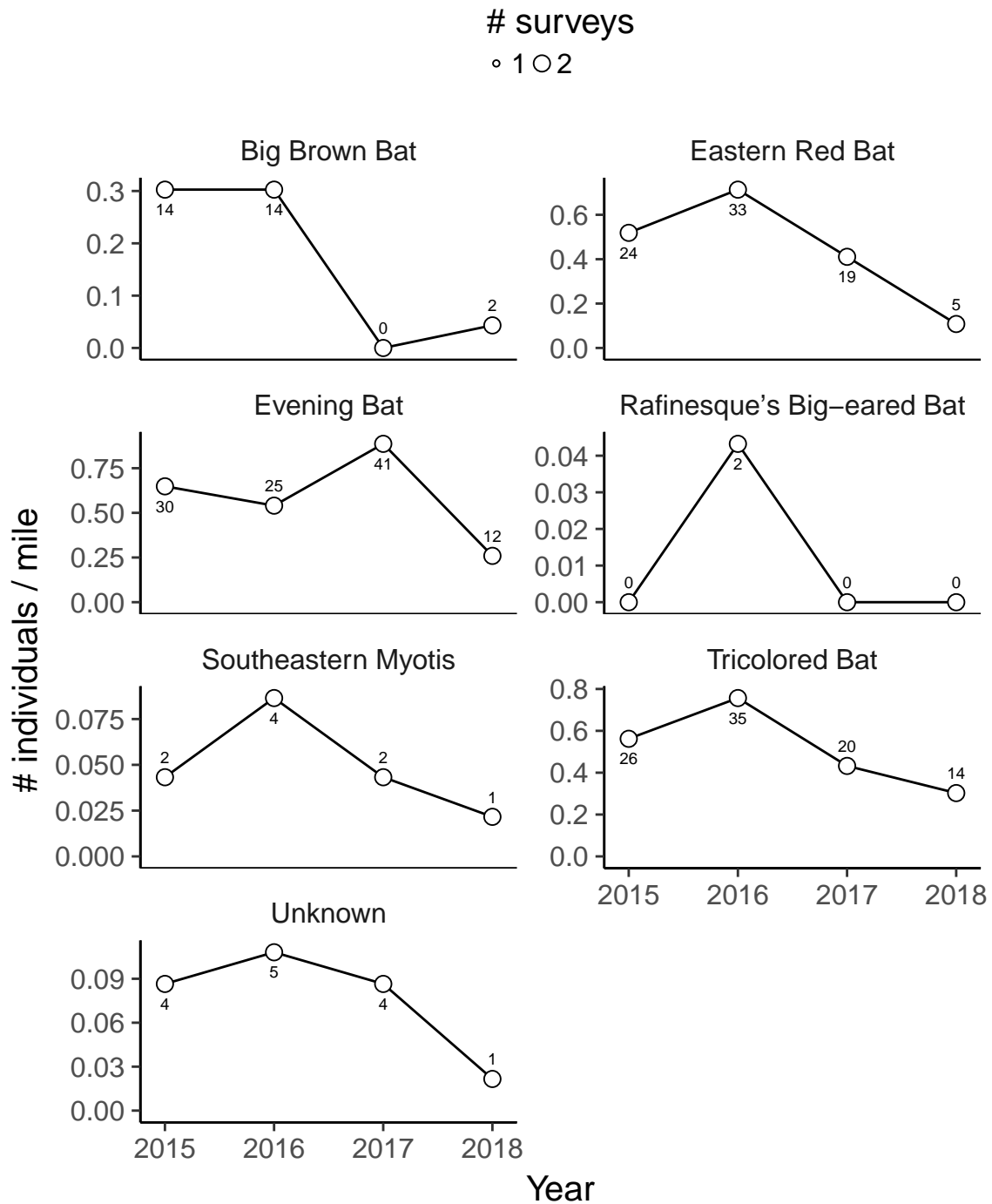
Figure 1: Figure version of the previous table. Detection rates of bat species. Point size indicates the number of surveys conducted for the route. The number associated with each point indicates the total number of individuals detected across all surveys. Total route length = 23.126 miles.
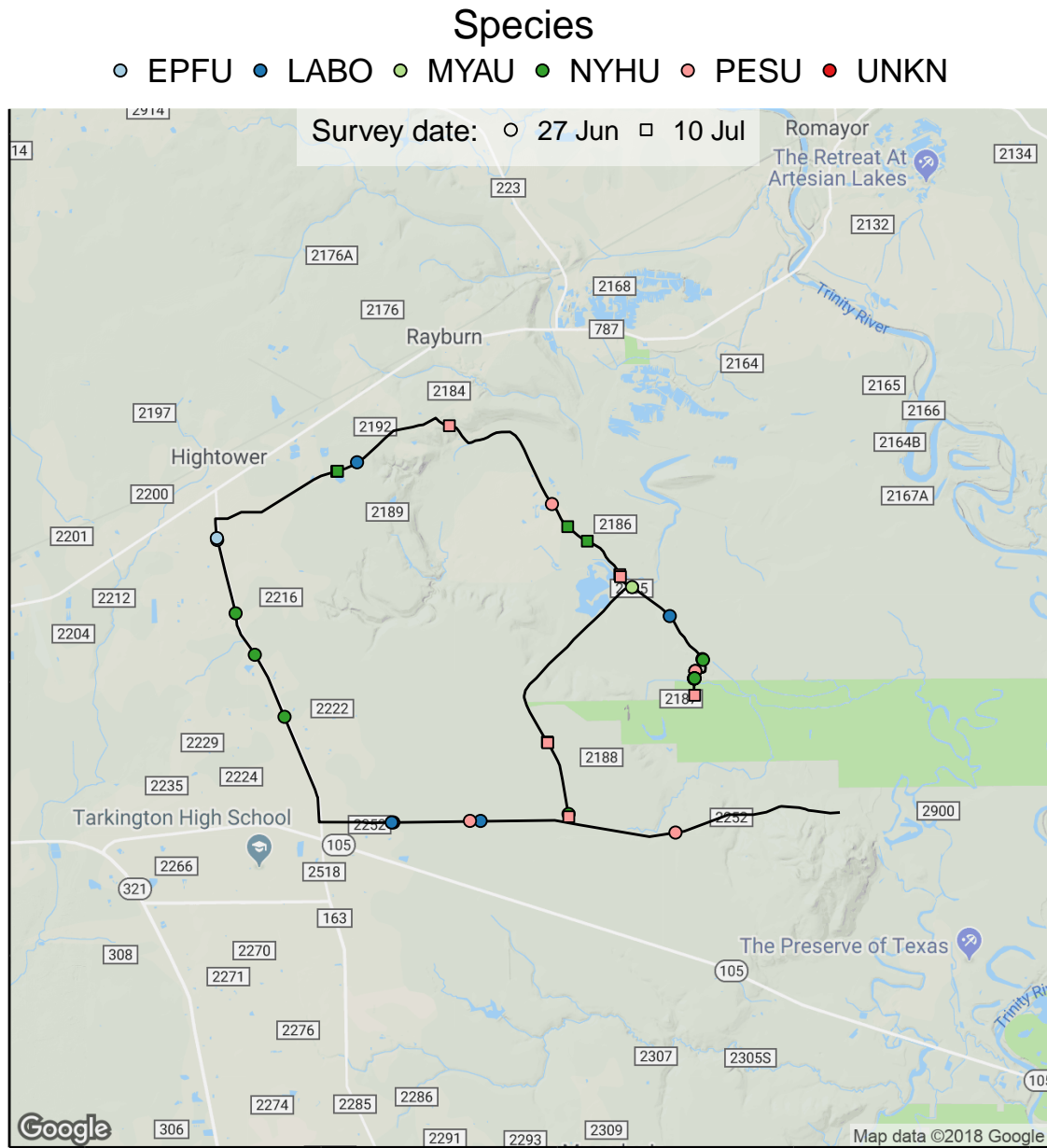
Figure 2: 2018 georeferenced bat detections superimposed on the TrnNWR survey route. All recorded calls are represented. Total route length = 23.126 miles.